

## RESIDUAL CONTENT OF TETRACYCLINE HCl IN POULTRY PRODUCTS (MEAT AND LIVER) AS A RESULT OF GIVING FEED ADDITIVE FOR THE WHOLE LIFE

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### RANGKUMAN KANDUNGAN RESIDU TETRASIKLIN HCl DALAM PRODUK UNGGAS (DAGING DAN HATI) SEBAGAI HASIL PEMBERIAN "FEED ADDITIVE" SEUMUR HIDUP

Antibiotika telah lama digunakan di bidang peternakan sebagai "Feed additive" dalam ransum untuk membuat pertumbuhan ternak menjadi lebih cepat, bobotnya bertambah dengan daging berkualitas baik dan mengurangi angka kematiannya. Tetapi pemberian antibiotika dalam ransum ini akan menyebabkan timbulnya residu dalam produk dan dapat mengganggu kesehatan konsumen.

Untuk mencegah efek samping tersebut, dilakukan penelitian tentang berapa banyak residu yang tertinggal sehingga dapat dibuat suatu tindakan penanggulangannya.

Penelitian dilakukan terhadap 5 grup ayam yang masing-masing terdiri dari 24 anak ayam jenis Hubart (12 jantan dan 12 betina) dan diberikan tetrasiklin HCl dengan dosis 0, 25, 50, 100 dan 250 mg per kg ransum, menghasilkan data sebagai berikut :

1. penambahan tetrasiklin HCl pada ransum sampai ke dosis 250 mg/kg tidak menimbulkan residu di daging.
2. dosis 100 mg dan 250 mg/kg ransum memberikan residu 0.84 mcgr dan 7.02 mcgr per kg hati, pada ayam jantan dan 250 mg/kg ransum hanya meninggalkan 2.19 mcgr/mg hati ayam betina.
3. residu tetrasiklin dalam hati dimusnahkan oleh pemasakan.

### SUMMARY

Antibiotic has long been used by farmers as "feed additive" in ration in order to make the livestock grows rapidly, heavier and of high quality flesh, besides reducing its mortality

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rate. On the other hand, antibiotics given to the animals can cause residues on its products and endanger the consumer's health.

In order to protect the consumer, it is necessary to do a research on how much antibiotic residues left in the product as a result of giving feed additive so that necessary measures can be taken into consideration.

The research has been done on 5 groups of chickens consist of 24 chickens each of broiler strain Hubbard (12 males, 12 females) which have been given tetracycline HCl with the dosage of 0, 25, 50, 100 and 250 mg/kg ration, pointed out the following results:

1. the addition of tetracycline HCl at ration up to the dosage of 250 mg/kg ration doest not produce residue on fresh meat.
2. the dosage of 100 mg and of 250 mg/kg ration gift a residue of 0.84 mcgr/mg liver and 7.02 mcgr/mg liver respectively on male chicken liver, where as the addition of 250 mg/kg ration only 2.19 mcgr/mg liver on females.
3. the residue of tetracycline HCl decomposed on the wellboiled liver.

## INTRODUCTION

Antibiotic has long been used in the field of veterinary medicine. Besides, it is also used by the farmer to promote the growth and productivity. In poultry breeding antibiotic used mostly as feed additive. In 1961 Jull pointed out that some antibiotics such as penicilline, basitracine, terramycine, tetracycline and streptomycine in small amount in ration can stimulate the growth of young chicken. Before Jull, Heuser (1955) has pointed out that 1-2 grams of antibiotic/ton of ration can stimulate the growth of the chicken and even the big amount of does not give negative effects. This, in fact, was argued by Libby and Schaible (1955) in their research which pointed out that antibiotic given to the continually for a long period of time can make the growth decreases. However, Winter and Funk (1957) proved that 1-10 grams of antibiotic in 10 tons of ration can stimulate the growth. Bell (1959) also proved that 30 mg of antibiotic/ton chicken food can make good final weight when it is sold. Bird and Heath (1962) stated that the range of 10-35 ppm is favourable. Triebold (1960) also stated that addition of antibiotic does not effect the flavor, odor and color of the product besides of the antibiotic residue is very low.

As a matter of fact, antibiotic will be excreted through urine and feces (Ewing, 1963 and Gan, 1980) but it takes time, and if it happened exceedingly, it will give negative effects. The antibiotic residue on animal product has been proved by Hokanson and Bruch (1963). Up to now, some countries permits the antibiotic usage as feed additive based on the knowledge that antibiotic damaged by the heat process (above 70°C). Yet, this fact is still felt frivolous, because there are many people still eating raw and half cooked meat so that it is possible that people are affected by antibiotic residue. Therefore, in order to avoid the presence of antibiotic residue in poultry products the writers is interested to do a research on how much tetracycline can be added in poultry ration so that there is no residue detectable in its products.

## MATERIAL AND METHOD

In this research 120 heads of strain Hubbard broilers (60 males, 60 females) of 10 days



of age are used. Both the males and females are divided into 5 groups, each of which is given ration containing tetracycline HCl of 0, 25, 50, 100 and 250 mg/kg ration. This additive is given for two months and the chickens are then slaughtered, and the breast and liver are extracted. The ration use was made by PT Cargill Indonesia contains 21% protein, 2.5% fat, 4% fibre and 6.5% ash. Tetracycline HCl is obtained from Kimia Farma Indonesia. The presence of tetracycline HCl is detected by colour reaction and measurement using "Ultraviolet Spectrophotometry" Perkin Elmer, type 550 S with Sergover 3,11 recorder. The detection is done on the extracted material. The observation is measured maximum 269 Um. The examination of colour reaction is done on the result of the extraction with concentrated sulfuric acid, ferri chloride solution 5% in metanol, Trohde and Marguis.

The design used in the tabulation is completely randomized design with 5 x 2 factorial, e.i. 5 kinds of dosage (0, 25, 50, 100 and 250 mg/kg ration) and 2 kinds of sex (male and female), triplicate.

The parameter is measured qualitatively using colour examination and quantitatively using Ultraviolet Spectrophotometry in mcgr.

The data analysed descriptively, anova and finally by Duncan multiple range test.

## RESULT

The residue of tetracycline HCl in the fresh meat of both the male and female chickens receiving tetracycline HCl in feed with the lowest and highest dosage can not be detected with colour reaction and ultraviolet spectrophotometry. This show that tetracycline HCl in the range of dosage given, because in such dosage the residue can still easily be extracted through feces and urine. It is also possible that the two methods of test used were not sensitive. The absence of this residue fits the results of the researches done by Ewing (1963) and Bird & Heth (1962), but according to the result, the absences of the residue was caused by the fact the animals were rested for a long period before slaughter so that all of the residues were excreted through feces and urine. The presence of the residue of tetracycline HCl in fresh liver with colour reaction test can be seen on Table 1.

Table 1. Tetracycline HCl residue in fresh liver as result of colour reaction test.

Repetition	Dosage of tetracycline HCl/kg ration									
	0 mg		25 mg		50 mg		100 mg		250 kg	
	♂	♀	♂	♀	♂	♀	♂	♀	♂	♀
I	-	-	-	-	-	-	+	-	+	+
II	-	-	-	-	-	-	+	-	+	+
III	-	-	-	-	-	-	+	-	+	+

Note : - = negative reaction (no residue)  
 + = positive reaction (presence of residue)  
 ♂ = male  
 ♀ = female



From table 1 can be substantiated that it is evident that the liver of the male chickens with 100 mg and 250 mg of tetracycline HCl/kg ration contains residue, and so does the female chickens which received 250 mg. However on female chickens receiving ration with tetracycline HCl 100 mg/kg ration there was not any residue found. Most probable this difference was caused by the difference in sexes where the male chickens consumed more food so that the residue was higher and at the dosage of 100 mg of tetracycline HCl/kg ration it deposit on the liver and was not neutralized. The presence of this residue agreed to the Ewing's finding (1963) which stated that tetracycline HCl of high dosage/given orally will cause poisoning of the liver.

The result of the ultraviolet spectrophotometry showed the same thing as the result of colour test as seen on Table 2. On this, we concluded that the dosage of feed additive plays a quite important role in determining the amount of residue, i.e. the more dosage given, the more residue will be present on both the male and female chickens.

**Table 2. The amount of the content of tetracycline HCl residue in raw liver resulting from ultraviolet spectrophotometry test (mcgram/mg liver).**

Repetition	Dosage of tetracycline HCl/kg ration									
	0 mg		25 mg		50 mg		100 mg		250 mg	
	♂	♀	♂	♀	♂	♀	♂	♀	♂	♀
I	0	0	0	0	0	0	1.12	0	9.26	0
II	0	0	0	0	0	0	1.39	0	11.79	2.63
III	0	0	0	0	0	0	0	0	0	3.95
Overage	0	0	0	0	0	0	0.84	0	7.02	2.90

It is proved that the factor of dosage of tetracycline HCl in ration is significantly influential ( $P < 0.01$ ) and it is closely related to the sex factor shown by the clear interaction between the dosage and the sex.

Data from Table 3 can be interpreted that on the male chickens the dosage of tetracycline HCl in ration is significantly influential ( $P < 0.01$ ), but not on the females the influence of sex factors can only be seen on tetracycline HCl at the dosage of 250 mg where the residue on both sexes is significantly different: the residue on the male (7.0174 mcgr). This result is the same as that of Edward (1963), North (1972) and Sudarmodjo (1974). All these researchers pointed out that the male chickens are bigger than the female ones as a result of the difference in feed consumption.

The result of colour reaction and ultraviolet spectrophotometry on cooked meat and liver of all the chickens receiving different dosages of tetracycline HCl are negative. These results substantiated that antibiotic damaged by heating to more than 70°C. Which has been pointed out by the former researchers, namely Ewing (1963), Triebold (1960) and Sulistian (1980).



**Table 3. The result of multiple range test for tetracycline HCl residue in fresh liver of different dosage in ration in different sexes (microgram/mg fresh liver).**

Sex	Dosage of tetracycline HCl/kg ration				
	0 mg	25 mg	50 mg	100 mg	250 mg
Male	0	0	0	0,8487(a)	7,0174(b)
Female	0	0	0	0 (a)	2,1938(a)
Difference	0	0	0	0.8387	4,8246++

Note : — the same letter in the horizontal direction shows significance.  
 ++ highly significant difference to the vertical.

### CONCLUSIONS

From the result and the discussion above, the following conclusion can be drawn :

1. The addition of tetracycline HCl in chicken ration up to the dosage of 250 mg/kg ration does not cause residue in their fresh meat.
2. In the fresh liver of the male chickens which received tetracycline HCl with the dosage of 100 mg/kg ration and the dosage of 250 mg/kg ration showed the presence of tetracycline HCl residue of 0.8387 mcgr/mg liver, and 7.0174 mcgr/mg liver respectively. Female chickens which receive more than 250 mg/kg ration, a 2.1938 mcgr tetracycline HCl residue/mg liver were found. The boiling process damages the residue in meat and liver.
3. The safest dosage of tetracycline HCl to be added to the ration of chickens is under 50 mg/kg ration.
4. The poultry products which is surely free from tetracycline HCl residue is the ones which is well cooked.

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  3. The safest dosage of tetracycline HCl to be added to the ration of chickens is under 20 mg/kg ration.
  4. The poultry products which is surely free from tetracycline HCl residue is the ones which is well cooked.

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